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ABSTRACT

A selective dissemination service (SRIM) of the National Technical Information Service (NTIS) features semimonthly dissemination of microfiche copies of documents newly added to the NTIS collection, on the basis of interest profiles. The service was used to test a university subsystem wherein a number of individual profiles were combined and submitted to NTIS as a composite. Microfiche documents received were duplicated in sufficient copies to meet local distribution requirements, including one copy for library purposes. The study indicates the effect of local agency in stimulating and mediating the use of an SDI system, and the relative economy of local copying and redistribution of microfiche over direct ordering at current NTIS prices. SRIM is evaluated from the viewpoint of middleman and of users engaged in science, technology, and higher education. The categorical structure in which the service is implemented is found wanting in the kind of precision, detail, definition, and stability needed to serve users in this sector. (Author/EMH)

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GOVERNORS STATE UNIVERSITY - LEARNING RESOURCES CENTER
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FINAL REPORT

PROJECT CLR-561

SELECTIVE DISSEMINATION OF MICROFICHE DOCUMENTS IN A UNIVERSITY SETTING: PHASE I

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Submitted to the University and to the
Council on Library Resources,
Washington, D. C.

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PART ONE

INTRODUCTION

A. OBJECTIVE

The objective of the project was to develop, test, and evaluate a system for using the "Selective Dissemination of Microfiche (SDM)"[1] service of the National Technical Information Service (NTIS) on a local redistribution basis, in a university setting. The project was viewed as a pilot to a more comprehensive study of microform document dissemination and use, hence the designation: "Phase I".

B. BACKGROUND

1. The NTIS Document File

The National Technical Information Service (NTIS) is the official depositary for all scientific and technical reports forwarded to it by the Federal government agencies, contractors, and grantees, and is responsible for the retention, bibliographic control, duplication, and onward distribution of such documents. The enabling legislation created NTIS (originally "Clearinghouse for Scientific and Technical Information (CFSTI)"):

> *"... (a) to search for, collect, classify, coordinate, integrate, record, and catalog such (scientific, technical, and engineering) information from whatever sources, foreign and domestic, that may be available;*

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[1] Now called "Selected Research in Microfiche (SRIM)". The service will be referred to as such in the remainder of this report.

(b) to make such information available to industry and business, to State and local governments, to other agencies of the Federal government, and to the general public, through the preparation of abstracts, digests, translations, bibliographies, indexes, and microfilm and other reproductions for distribution either directly or by utilization of business, trade, technical, and scientific publications and services;

(c) to effect, within the limits of (the Secretary's) authority and with the consent of competent authority, the removal of restrictions on the dissemination of scientific and technical information in cases where consideration of national security permit release of such data for the benefit of industry and business..."

-----15USC1152

The record of the hearings that led to the enactment of this legislation supports a conclusion that:

(1) the technical and financial implications of a mission of such scope were not fully appreciated at the time, and that

(2) the main intent of the legislation was to serve commerce and industry by making the results of scientific and technological research and development readily available to that particular community.

The documentary collection created and maintained by NTIS, as well as the bibliographic system that provides access to that collection, comprise a major scientific and technical resource. However, both are of the nature of incomplete sets, only partially fulfilling the mission. The reason for this is that the collection is limited to documents voluntarily contributed by federal government agencies, contractors, and grantees, accompanied by a required fee.

There is no assurance that all of the documents that might be suitable and eligible for the collection are in fact contributed, nor is any formal quality control exercised over the documents that are taken into

corpus. Also it should be understood that documents covering educational research and development are generally omitted, as these normally find their way into the Educational Resources Information Center (ERIC) collection, likewise those in the field of health services, which go to the National Library of Medicine and are reflected in Index Medicus.

2. The Bibliographic File

The bibliographic file, i.e., the file of records providing intellectual access to the collection, employs standard format. It is subject to minor irregularities in that most of its records are prepared within the contributing agencies, rather than within NTIS. Records and underlying documents are accessioned in multiple sequences according to source rather than in a single sequence. The file contains many records of documents not actually in the collection ("not available from NTIS"). This is seen as a useful (albeit undefined) extension of coverage.

The file is published in printed form as Government Reports Announcements and Index. Since 1970 it has also been available in machine-readable form, on magnetic tape, but under terms of lease that tend to deny public domain in this medium.

For a further overview of NTIS, its products, and its services, the reader is referred to the latest semiannual pamphlet NTIS Information Services (NTIS-PR-154) and to the article "NTIS Update: A Critical Review of Services" (Meredith) in Government Publications Review, 1:4, Fall, 1974, p. 343-361.

3. The Selected Research in Microfiche (SRIM) Service

Among the many products and services offered by NTIS is a semimonthly service called "Selected Research in Microfiche" (SRIM) (see Appendix I).

This service had its beginnings in 1969, and at that time was called "Selective Dissemination of Microfiche" (SDM). The idea has been the same throughout: namely, that on the basis of one or more subject categories chosen by the patron, NTIS would automatically supply microfiche copies of newly accessioned documents in those categories, at a considerable reduction in price (currently 45 cents per copy, as compared with $1.45 for copies furnished in response to specific orders).

The service has the advantage of ensuring an orderly flow of certain documents to a subscriber without his having to select them from the semimonthly Government Reports Announcements and Index. It should be clear that this advantage, and the lesser cost per document, operate only if (1) the categories selected by the patron coincide with his idea of what should be in them, and (2) the majority of documents placed in a category are in fact central to that category as understood by the patron. These conditions require, in turn, that the scope of each category be logical, reasonably constant, and reasonably well understood.

It is important to distinguish between SRIM, which is a selective dissemination service from a limited file, and a true current awareness service, which draws on many files and other sources, aiming at universal coverage of new information on a given topic.

4. SRIM-Profile

"SRIM-Profile" is a service that resembles SRIM in most respects, except that retrieval from the semimonthly increment to the bibliographic file is based on index terms occurring in the descriptor field of each bibliographic record, and/or other specifics, such as terms occurring in the identifier field. This permits much finer specification and finer tuning

of the patron's requirement than does ordinary SRIM, beside permitting some compensation for idiosyncracies of the file.

The cost of documents retrieved and shipped through the SRIM-Profile system is the same as with ordinary SRIM. NTIS makes an additional charge of $100 for initial set-up and service for one year; also $5 to $35 per revision, based on staff time involved.

SRIM-Profile uses independently-developed software run on a computer at the Bureau of the Census. It is understood that the system affords fewer options than commercial counterparts (such as Lockheed's DIALOG) but that it does at least accept Boolean expressions nested to the second level.

The service does not fall within the main scope of this project. However, we used the same kind of approach at one point in analyzing patrons' needs and it is briefly considered as a selective dissemination tool later in the report.

5. The University Setting

The setting in which the project was undertaken is a new senior level (upper division plus masters) state university, now beginning its fifth year of operation. Full time faculty are divided into four colleges, in the proportions shown[1]:

	1-1-73	Current
Environmental and Applied Science (EAS)	24	33
Business and Public Service (BPS)	24	40
Human Learning and Development (HLD)	23	53
Cultural Studies (CS)	19	34
Totals	90	160

[1] These figures do not include personnel in administrative positions and in support units holding faculty appointments.

While the nature of most NTIS materials is such that chief interest therein occurs among the faculty of the College of Environmental and Applied Science (EAS), a number of topics in the published schedule -- such as those bearing on urban affairs, business, statistics, and behavioral studies -- appeal to interests in the other colleges as well. Hence the interest, along with the potential, was university-wide, though markedly greater in EAS than elsewhere.

Throughout the university, the teaching function has predominated. The thrust is toward maintenance of existing competencies, and the transmittal of those competencies to others, in innovative ways, rather than toward ongoing research. Thus an effective selective dissemination system for keeping faculty abreast of developments in their particular fields could be expected to prove popular and useful.

6. The Learning Resources Center (LRC)

The university's Learning Resources Center (LRC) serves the usual functions of a university library, with emphasis on microform, non-print media, self-instructional materials, etc., presented in ways that are fairly innovative.

The professional staff of the LRC include a systems librarian and four liaison librarians each of whom is assigned to one of the four colleges. The liaison librarians were able to help in providing a link between their respective faculties and the systems librarian in his role as principal investigator for the project.

Through an earlier "mini-grant" from university funds for research and innovation, the LRC obtained a number of personal microfiche readers for

the use of participants in the project. Also available for project purposes were a number of additional portable readers, and an Atlantic microfiche copier (exposure unit and developer unit).

PART TWO

RATIONALE

The rationale for a local redistribution system of SRIM documents rested on the following beliefs and conditions:

1. *SRIM appeared to be an easy and economical way of obtaining and distributing documents in any combination of topics.*
2. *Faculty were unlikely to take advantage of SRIM on an individual basis, but with proper encouragement, support and coordination might do so collectively.*
3. *Equipment for producing multiple copies of microfiche at a fraction of the price charged by NTIS, was available in the LRC.*
4. *The LRC was also in a position to furnish system design, initiation, coordination, and maintenance of a system for exploring 1, 2 and 3 above. At the same time such a system would permit strengthening the LRC's own microfiche collection through retention of one copy of each document received.*

PART THREE

PROCEDURE

The procedure followed the lines originally proposed, subject to unavoidable schedule changes, essentially as follows:

We would arrange with NTIS for SRIM coverage of a composite profile that would include the individual interest profiles of all participating faculty members. On receipt of each shipment of microfiche documents corresponding with the composite profile, we would produce sufficient copies of each to meet local distribution requirements, using our own fiche-to-fiche copying equipment. The "masters" received from NTIS would be retained in the LRC's own collection of NTIS documents.

Personal (portable) microfiche readers would be made available to faculty on a loan basis.

A record of receipts and distributions would be maintained. Also "slices" of individual distributions would be listed by author and title for subsequent analysis.

At the end of the first three months of operation, individual profiles would be refined, and the composite profile modified accordingly. During the next six months we would evaluate the system as an ongoing service of the LRC. No charges were to be levied for the service.

PART FOUR

NARRATIVE

A. ESTABLISHING THE PROFILE

At the time of approval of the project, we had already initiated an operation along the lines set forth in the proposal. The composite profile in effect at that time had been formulated in the following way: the planned service was first explained to the faculty by memorandum, supplemented by an article in the university's weekly newsletter. The four liaison librarians were briefed, and were asked to interview each member of the faculty in their respective colleges. Support staff holding professional appointments were also interviewed.

Thirty-three individuals requested the service. Each of them selected one or more of the topics listed in NTIS publication PR 6-02 (Jan. '71) (see Appendix I), comprising his interest profile. No other selection tool was used, as none was available. The scope and nature of the materials actually coming into a category or subcategory could only be conjectured from the title of that category or subcategory.

The individual profiles were then merged into a composite profile, comprising 127 subcategories within 31 categories, which amounted to 40.2% and 85.5%, respectively, of the available 316 subcategories within 35 categories. From data furnished by NTIS covering a 12-month period ending about December 1, 1972, similar to the sample page in Appendix I, it was estimated that the cost of covering this profile for nine months in the AD and PB series (with no cross-referenced documents) would be

about $3,124.00.

The first set of participants were located in colleges and support units as follows:

	Number	% of Participants	% of Faculty
EAS	13	40%	54%
BPS	3	9%	12%
HLD	5	15%	22%
CS	8	24%	42%
SUPPORT UNITS	4	12%	
Totals	33	100%	

The 29 collegial participants represented 32% of the so-called "teaching faculty", as distinguished from individuals holding university professorships, but who were primarily engaged in other duties.

This was the set of participants on July 1, 1973, the official starting date of the project. At that time we were receiving documents in 133 of the 316 subcategories listed in NTIS PR 6-02. Individual profiles ranged from 1 to 27 subcategories. Duplication requirements for single subcategories ranged from 1 to 11, the most popular being 56E EDUCATION. The mean duplication requirement was 1.8 over the list, but this figure does not reflect differences in the numbers of documents occurring in the several subcategories. The actual duplication requirement of a typical shipment was on the order of 3.4 times the number of documents received.

B. SUSPENSION OF PROJECT

The first shipment received after the starting date of the project consisted of 585 of the documents listed in Government Reports Announcements (GRA) issue number 73-12, dated June 25, 1973. Of these, 166 were discovered to be out-of-profile, that is, the subcategory numbers shown on

the packing list were not among those which we had requested. NTIS, when queried on this, offered to credit our account with any documents returned. A second query elicited the information that NTIS was in the process of converting some of the categories and subcategories. We requested and received a copy of the rough conversion schedule in use, from which it was ascertained that some of the previous numbers had been collapsed into single new numbers, some had been expanded into two or three new numbers, some were converted on a 1-to-1 basis, and some of the old numbers were being re-used for other topics. Actually, these shifts had been going on since the first of the year, but went unnoticed until we began keeping close record of shipments.

To illustrate the effect of these realignments: recipients of former subcategory 53G URBAN PLANNING AND DEVELOPMENT documents were now to receive documents classified in <u>six</u> subcategories in a new category 91, as follows:

91 URBAN TECHNOLOGY
- *91A Environmental Management and Planning*
- *91D Communications*
- *91F Health Services*
- *91G Urban Administration and Planning*
- *91I Emergency Service*
- *91J Economic Planning*

They were joined by former recipients of fourteen other subcategories of the old set, who were now to share one or more of these same new numbers.

It was immediately apparent that the realignment meant diffusion and loss of precision. This is illustrated by the following comparison:

	<u>Before conversion</u>	*<u>After conversion</u>*
Range of subcategories per single profile	*1-27*	*1-36*
Range of sharing (duplication requirement) per single document	*1-11*	*1-19*

In short, the integrity of the individual profiles and of the composite profile had been seriously damaged by these revisions, which we learned were still going on. Accordingly we were forced to suspend the project until such time as the categorical structure might be stabilized and we could establish a new set of profiles with some degree of confidence.

In the interim, we reviewed some of the initial feedback, and made plans for conducting a new series of interviews. There was strong indication that even had the original categorical structure remained unperturbed, the documents distributed would not have met the expectations of the participants. The difficulty could be attributed in part to the fact that the scope of the various subcategories was nowhere stated, nor could scope be deduced from inspection of the GRA (since GRA omits all reference to SRIM categories).

During this period we also consulted with Dr. Don H. Coombs, Director of the School of Communication, University of Idaho, concerning the project. The principal investigator also visited NTIS headquarters in Port Royal, Virginia in order to gain a better understanding of the changes being made in the SRIM categorical structure.

C. *ESTABLISHING A NEW PROFILE*

It was decided to approach topical selection indirectly, using descriptors to define patrons' real interests, then trying to formulate combinations of subcategories that might conceivably serve those interests. For the purpose, we took advantage of an on-line retrieval facility (Lockheed Information Systems DIALOG) implemented at GSU in the Spring of 1974. The procedure was as follows:

1. Each participant was interviewed at length, with the Thesaurus of Engineering and Scientific Terms at hand, to obtain as precise an array of descriptors as possible, conveying his interest.
2. These arrays were expressed in Boolean combinations, and submitted to the DIALOG system to see how well the NTIS file would respond to the particular requirement.
3. In some of the cases wherein the retrieval proved sparse, we broadened the specification and tried again. In other such cases we were forced to conclude that the NTIS file just did not meet the needs of the client.
4. When the results were promising, we tried to identify, for each client, the subcategories in the new NTIS list (dated May 1, 1974) that seemed to enclose his specification. These subcategories comprised his new individual profile for SRIM service.

The resultant composite profile consisted of 56 subcategories within 18 categories. It was transmitted to NTIS on October 31, 1974, with a request that SRIM service be resumed thereon. The request was limited to AD documents only, as we had found that in the earlier attempt to cover both AD and PB series the volume of traffic contributed little to the main purposes of the study, while imposing a clerical load that was not readily accommodated in our particular situation, even though it was adequately budgeted in the project itself.

D. SIX MONTHS' OPERATION

The first shipment of microfiches resulting from the above request con-

sisted of documents covered in GRA 74-25, dated December 13, 1974. The packing list date was the same. The shipment was not received, however, until January 7, 1975. The delay which was to prove typical, as shown in the table given in Appendix II.

Production, that is, the series of operations involved in making the correct number of copies of each document received, followed the procedures described in Appendix III. Under ideal conditions, we were able to establish a rate of 809 fiche copies per hour on the equipment in use, or one every 44.5 seconds. The rate per document was somewhat less, since many of the documents were carried on two or more fiches. (In a sample shipment the mean was 1.42 fiches per document.) The practical cost of copying the documents averaged about 27 cents (see Appendix III).

Distribution was made through inter-office mail in returnable envelopes labeled: "Please check the titles of these microfiches for possible interest, and return the remainder to me". Returns were about 100% in eleven of the subcategories (see Appendix IV) and on March 22, 1975, we submitted a new composite profile omitting these and adding two others that had been asked for. The net reduction amounted to nine subcategories, or 16% of the original list. At the same time we requested resumption of coverage in the PB series, to see what effect this would have on total traffic, knowing that the impact of a sharp increase on our operation would be minimal, since it would occur toward the end of the test period.

These changes were acknowledged on April 17, 1975 and effectuated with the shipment corresponding with GRA&I 75-10 dated May 16, 1975[1], and

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[1] Government Reports Announcements (GRA) and Government Reports Index (GRI) have been combined since the first of the year into Government Reports Announcements and Index (GRA&I).

received on June 25, 1975, about three months after the request.

On July 16, 1975, on receipt of shipment number 75-12, we wrote NTIS cancelling the SRIM service. This was acknowledged on August 20, 1975 effective with shipment number 75-18, with credit for shipments number 75-16 and 75-17.

Also in July and early August we conducted a survey covering participants' experience with, and evaluation of, the system (see Appendix V).

E. MISCELLANEOUS

A chronology covering most of the foregoing narrative has already been provided in Financial and Substantive Reports No. 1 and No. 2. The reports also discuss two extensions of the project that were never carried out, and it is appropriate to touch on them here.

The first was to set up a sub-collection of microfiche documents in EAS, to receive all document copies that distributees in that college did not want to retain for their personal use. The idea met with general approval, but was never implemented, because of lack of funds for acquiring a reader-printer for use at the central location in EAS.

The second was to inaugurate SRIM-Profile (see I.B.4 above) briefly for about six of the participants, and to substitute documents received from this service for those which would have been delivered through ordinary SRIM. We would then survey that particular set of participants to see if they had noted any marked improvement in relevance ratios. The plan was largely obviated in the course of re-establishing the profiles as described above, which offered ample opportunity for comparing descriptor-based

retrieval with categorical retrieval from the NTIS file. Also there was reason to believe that system inertia would make such a trial impractical during the six-month test period.

The final accounting of expenses charged against CLR Grant 571 is set forth in Appendix VI.

There was no resistance to the use of microfiche as an information medium, nor to the idea of using microfiche documents as vehicles of dissemination, among the set of professionals who volunteered for the study. It is impossible to say how many of those who failed to volunteer did so because they disliked the medium and/or the idea; how many because they decided that the NTIS collection did not address their interests; and how many because they were preoccupied. We did not recruit additional participants during the course of the project, even though some of the faculty added during this time expressed interest in the service.

PART FIVE

EVALUATION

A. GENERAL

The system for using the NTIS SRIM service on a local redistribution basis was essentially a subsystem of the NTIS system, so it needs to be considered in two aspects:

1. As a subsystem of NTIS and as such subject to the faults and failings of the larger system, as well as having a potential (at least) of exploiting its strengths and advantages. A subsystem can hardly be better than the system on which it depends, though it can be totally inadequate in extending its benefits. Since the project was identified from the beginning with NTIS SRIM, SRIM itself needs to be evaluated before we can say whether, and how well, the subsystem extended the benefits without aggravating the faults.
2. As a subsystem of an idealized main system having the same general configuration as SRIM, but one in which the circumstantial constraints and aberrations of SRIM would be inoperative.

These aspects will be considered in the above order, which lends itself to the conclusion and recommendations.

B. AS A SUBSYSTEM OF NTIS SRIM

It is necessary at this point to recapitulate some of the limitations of

the NTIS document collection and its bibliographic apparatus, referred to under "Background" above:

1. *Only documents generated under auspices of the Federal Government are included.*
2. *Not all eligible documents that might be appropriate are included, because acquisition is passive rather than active, and because of the service charge for inclusion ($35).*
3. *Little or no quality control is exercised over documents brought into the collection, as long as they satisfy the external requirements.*
4. *Indexing and abstracting is usually performed within the contributing agencies, rather than being centralized.*

To these must be added certain limitations, identified with SRIM service, which have had a direct bearing on the efficacy of the project subsystem:

5. *It is difficult to relate the arrangement of document resumes in GRA&I with the classification used for SRIM. Use of two separate schedules detracts from the authority of each.*
6. *The classification schedule used for SRIM[1] is geared to a supposed "information market" (mainly the industrial/commercial sector) rather than to a disciplined taxonomy of scientific and technical information.*
7. *NTIS makes arbitrary changes in the SRIM classification schedule without consulting or notifying SRIM users.*

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[1] *Now conforming to the schedule used for "Weekly Government Announcements" (WGA).*

8. *NTIS furnishes no scope notes for SRIM categories and subcategories, so that establishment of a SRIM profile is largely a hit-or-miss affair.*

9. *The categories and subcategories in use are too broad to answer the needs of specialists.*

10. *By placing all categories and subcategories on an equal footing, NTIS obscures the fact that some categories are covered so thinly as to be scarcely covered at all*[2]. *This raises false expectations among users.*

11. *Lack of a SRIM-category code in the eye-legible headings of the microfiche documents complicates the production of copies for redistribution. That is, it becomes necessary to transcribe these codes from the packing list to the envelopes in which the documents are shipped.*

12. *The delays in starting and stopping SRIM service, in changing existing profiles, and in receipt of shipments are excessive, to a degree incomprehensible in a supposedly computer-based service.*

13. *The service provides no feedback mechanism that might lead to improvement.*

Lest it be thought that there are no favorable elements, the following should be noted:

14. *The microfiche received are of uniformly excellent quality, from which good third-and-fourth-generation copies can be made without difficulty.*

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[1] *In a 4½ month period, 32% of the categories yielded only 6% of the documents.*

15. SRIM service, once invoked, continues automatically without further initiative on the part of the client.

16. SRIM service provides documents at a price considerably less than they could be obtained through specific order by a factor of .31. Theoretically, this advantage disappears when the relevance ratio becomes less than .31, but such a benchmark doesn't take into account the time involved in selecting titles from GRA&I and ordering them direct.

The redistribution system was largely transparent to the above-mentioned advantages, faults, and constraints. Its existence permitted several members of the university community to acquire documents which they would not otherwise have known of except through citations or chance perusal of GRA&I. The results of the survey (see Appendix V) confirm this transparency, in that most of the shortcomings noted are directly attributable to the main system rather than to the subsystem.

Interposing a local redistribution system exacerbated the delays of the main system, sometimes adding several days to the time required to get the documents to the users. The participants were not critical of this delay, however, and probably were no more aware of it than they were of the delays in the main system.

An advantage of the subsystem which more than offset the local delay, in our opinion, is the fact that profiles (for better or worse) were directly negotiated with a local agent, i.e., an information specialist having some knowledge of the nature of the collection and of its bibliographic controls, and able to work out profile specifications that presumably

would give the main system the best opportunity for useful response.

C. AS A SUBSYSTEM OF AN IDEAL SYSTEM

The redistribution system tested in this project is basically simple. It is much like a community shopping service, through which several families place standing orders for commodities to be purchased at a distant market. Likewise it is of value to the community only as long as it offers advantages of convenience and economy over direct purchase, and as long as the stock in trade of the distant market is worth buying.

We have observed that the subsystem is almost transparent, as far as the users are concerned, except for the element of local agency. The value of that element in negotiating profile specifications, making adjustments, etc., is difficult to assess, because it is a function of two variables: the level of users' information skills and the effectiveness of the retrieval mechanism.

In this step of the evaluation process, we need to imagine an ideal SRIM-type service, part of an ideal NTIS-type system. In such a system, we would expect careful screening of documents coming into the collection and an active acquisition program seeking out eligible documents from all available sources. Scope of acquisition would be stable and well defined. Bibliographic controls would be uniform, and subject to single authority. Retrievals from the bibliographic file would be varied to accommodate a wide range of purposes, including SRIM-type service.

As we know, NTIS SRIM retrievals are geared to a classification scheme of doubtful authority. It has come to reflect a marketing philosophy

exemplified by the "Weekly Government Announcements" newsletter, rather than adhering to a scientific taxonomy of things and ideas. This tendency, and the evident reluctance to identify the scope of the categories and subcategories either before or after mutation, call up the whole problem of defining a topic categorically and of conveying that definition to a prospective client. The difficulty weakens the case for any simple (non-faceted) system for access to a general technical file. How can such a system be precise enough to position a document in cognitive space without ignoring many of the things a document is "about"?

One alternative is to resort to a mechanism based on descriptors (and other useful elements,) of which NTIS SRIM-Profile is an example. Such a mechanism affords precision on a par with the indexing, and is obviously preferable for a user who knows what he wants. It recognizes his uniqueness, and serves it. It does not necessarily detract from the efficiency of a redistribution system such as we have been considering, because one and the same document may be called out for two or more patrons in response to their unique (but overlapping) profiles.

Retrieval systems typically identify, or identify and describe, items retrieved, usually without indicating which element(s) in the record caused the retrieval, even though such a feature is well within the technology. Such a service could be carried a step further by identifying the particular specification (among multiple sets) that called for the retrieval. This would open the way for a redistribution system tied to a SRIM-Profile type of service, free of the stresses and incongruities of a service based on categorical profiles.

The performance of the redistribution subsystem during the test period

leads one to believe that it could be readily adapted to a retrieval/ dissemination system along the above lines. Whether or not it would then be cost-effective would depend on the duplication factor, on the cost of duplication compared with the cost of microfiche supplied directly from source, and on the value of local agency in negotiating profiles and in giving effect to feedback.

D. INCIDENTAL BENEFIT

In evaluating the redistribution subsystem under either real or idealized conditions, it is necessary to recognize the value of microfiche documents spun off to the university's library collection. The effect is one of automatically strengthening the collection in areas likely to serve academic programs endorsed by a particular faculty. Unfortunately, the only practical way of accessing this material is through WGA&I, in the hope that a document of interest identified through that publication may be found in the incomplete set held in the library. The value of the collection would be greater if local indexing could be readily provided, but here again we are asking for something beyond the present range of offerings, i.e., a machine-readable list of accession numbers, run against the main tapes.

During the course of the entire project, including times outside of the nominal nine-month span, the LRC acquired a total of 12,705 NTIS documents, valued at $5,717 at the current SRIM rate, or at $18,422 if ordered separately. The actual cost during a particular span of time can be computed as the total cost of all documents received (@ 45¢) and of all copies generated (@ 27.4¢), multiplied by the percentage of documents going to the library. For the shipments covered in Appendix IV this works out to

34.5¢ per document taken into the collection.

E. CONCLUSION

The project has demonstrated the practicality of a redistribution service operating as an extension of a selective dissemination service, featuring the distribution of microfiche documents, in a university setting. The project has highlighted a number of problems besetting such a selective dissemination service, and the difficulty of palliating the effect of shortcomings of the main system. The project has demonstrated the value of local agency as a stimulant and mediator in exploiting a major information dissemination system for the benefit of a university faculty. The local system proved cost-effective even at a low duplication rate. This effectiveness was sustained in part by the incidental benefit to the university library collection. Lastly, the project permitted making a number of observations of the workhabits and preferences of university faculty in dealing with microfiche documents.

PART SIX

RECOMMENDATIONS FOR FURTHER RESEARCH

It is recommended that further research along lines suggested in the proposal be deferred until a signal improvement shall have taken place in the National Technical Information Service's policies and practices, or until some other national data source affords a suitable test-bed.

When undertaken, further research should seek to compare the effectiveness of SDI in document mode with the effectiveness of SDI in citation mode. Perhaps (1) combinations of the two, and (2) combinations of current awareness in citation mode with SDI in document mode, should be examined. The relative effectiveness of profiles based on classification schemes with profiles based on finer distinctions need to be compared, for two or more types of client. Techniques of profile management need to be better defined.

Direct selective dissemination of citations and/or text via computer systems should increasingly be kept in mind as the ultimate alternative to either paper or microform as the distribution medium.

APPENDIX I

DETAILS OF "SRIM" SERVICE

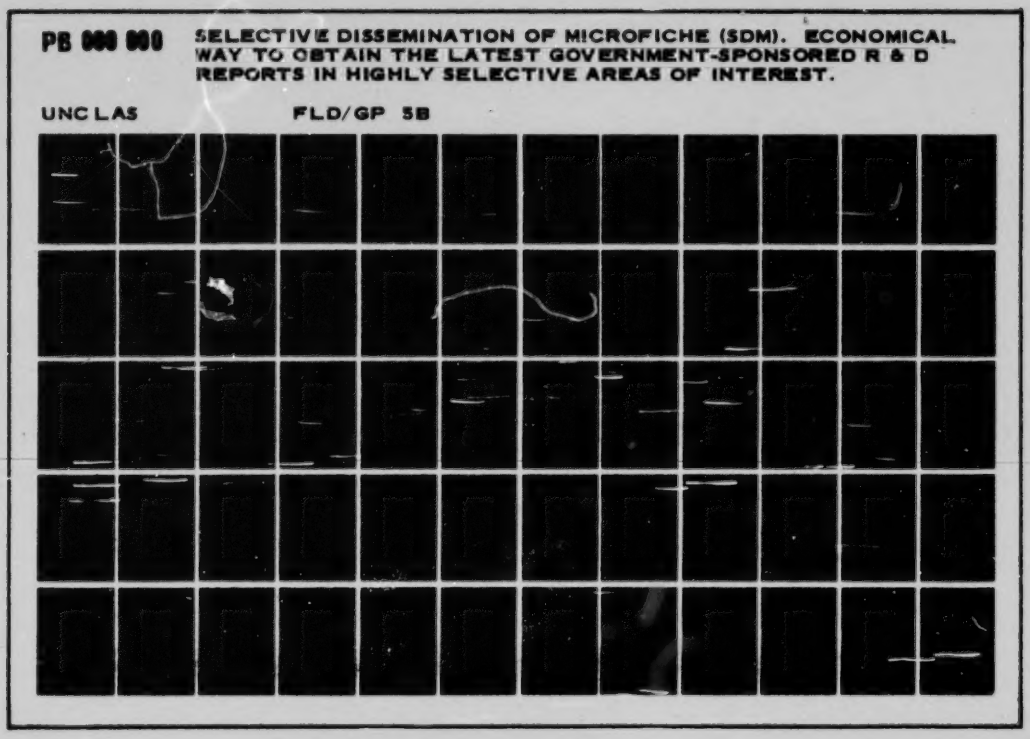
A. *Description of service and range of topics originally offered, as "Selective Dissemination of Microfiche" (SDM): NTIS publication PR 6-02 (Jan. '71) (attached).*

B. *Revised list of topics dated May 1, 1974, designated as "SCIM" categories (attached). (Note: "Selected Categories in Microfiche" (SCIM) was an interim term for the service.)*

C. *Typical schedule of 12-months' cost: sample page (attached).*

NTIS
U.S. DEPARTMENT OF COMMERCE

SDM


PB 000 000
SELECTIVE DISSEMINATION OF MICROFICHE (SDM). ECONOMICAL WAY TO OBTAIN THE LATEST GOVERNMENT-SPONSORED R & D REPORTS IN HIGHLY SELECTIVE AREAS OF INTEREST.
UNCLAS
FLD/GP 5B

SELECTIVE DISSEMINATION OF MICROFICHE (SDM) is a standing order service designed to provide the customer with microfiche copies of NTIS reports in highly selective fields of interest.

FEATURES . . .

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- Economical. 35 cents per title -- a savings of more than 50 percent.
- Fast. Automatic mailing as documents become available.

SELECTIONS. Documents can be ordered by SDM categories, by agency collection (NTIS, DoD, NASA, AEC), or by subject category within an agency collection. You can order by any major category, sub-category or combination of categories listed on the following pages.

PRICE QUOTATION. Make your selection, then write for a price quotation. Be sure to state if both prime and cross-referenced documents are desired, or only prime documents, eliminating cross-references. You will receive a price quotation based on the estimated number of documents to become available in your area of interest during the coming year.

National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22151

SDM Categories

51 **Aeronautics and Aerodynamics**

A. Aerodynamics
B. Aeronautics
C. Aircraft
D. Aircraft Onboard Checkout Systems
E. Air Facilities
F. Air Traffic Control Systems
G. Aviation Safety
H. Avionics
I. Flight Control Systems
J. Flight Instruments
K. Ground Effect Machines
L. Parachutes and Decelerators

52 **Agriculture and Food**

A. Agricultural Chemistry
B. Agricultural Economics
C. Agricultural Engineering
D. Agricultural Products Processing
E. Agronomy, Horticulture and Plant Pathology
F. Animal Husbandry and Veterinary Medicine
G. Fisheries and Aquiculture
H. Forestry
I. Natural Resource and Wildlife Management
J. Soil Sciences

53 **Area Planning and Development**

A. Housing
B. Land Use and Zoning
C. Public Utilities
D. Recreation and Recreation Facilities
E. Regional Planning and Development
F. Transportation Planning
G. Urban Planning and Development

54 **Astronomy and Astrophysics**

A. Astrogeology
B. Astronomy and Celestial Mechanics
C. Astrophysics
D. Cosmic Ray Research

55 **Atmospheric Sciences**

A. Aeronomy
B. Dynamic Meteorology
C. Meteorological Data Collection, Analysis and Weather Forecasting
D. Meteorological Instruments and Instrument Platforms
E. Physical Meteorology
F. Weather Modification

56 **Behavioral and Social Sciences**

A. Anthropology and Archeology
B. Area Studies and International Relations
C. Criminology and Law Enforcement
D. Demography
E. Education
F. Government, Public Administration and Political Science
G. History and Law
H. Humanities
I. Instructional Devices and Materials
J. Linguistics and Speech
K. Psychology and Psychometrics
L. Race Relations
M. Social Services
N. Sociology and Sociometrics

57 **Biological and Medical Sciences**

A. Anatomy
B. Biochemistry
C. Botany
D. Clinical Chemistry
E. Clinical Medicine
F. Cytology, Genetics and Molecular Biology
G. Dentistry
H. Ecology
I. Electrophysiology
J. Immunology
K. Microbiology
L. Nutrition
M. Occupational Therapy, Physical Therapy and Rehabilitation
N. Parasitology
O. Pathology
P. Pest Control
Q. Pharmacology and Pharmacological Chemistry
R. Physiological Psychology
S. Physiology
T. Psychiatry
U. Public Health, Hygiene and Industrial Medicine
V. Radiobiology
W. Stress Physiology
X. Surgery
Y. Toxicology
Z. Zoology

58 **Biotechnology and Medical Engineering**

A. Biomedical and Medical Engineering
B. Biomedical Instrumentation and Bioengineering
C. Bionics and Artificial Intelligence
D. Escape, Rescue and Survival
E. Human Factors Engineering and Man-machine Relations
F. Life Support and Space Biology
G. Prosthetics and Mechanical Organs
H. Tissue Preservation and Storage

59 **Chemistry**

A. Analytic Chemistry
B. Industrial Chemistry and Chemical Process Engineering
C. Inorganic Chemistry
D. Organic Chemistry
E. Organometallic Chemistry
F. Photochemistry
G. Physical Chemistry
H. Polymer Chemistry
I. Quantum and Theoretical Chemistry
J. Radio and Radiation Chemistry

60 **Civil, Structural and Marine Engineering**

A. Architectural Design and Programming
B. Civil Engineering

C. Construction Equipment, Materials and Supplies
D. Flood Control
E. Harbors and Port Facilities
F. Highway Engineering
G. Marine Engineering
H. Structural Engineering
I. Water Supply Systems

61 Communication Systems

A. Communications Security
B. Optical Communication Systems
C. Radio Communication Systems
D. Satellite and Space Communication Systems
E. Subsurface Communication Systems
F. Telemeter Systems
G. Television Communication Systems
H. Wire Communication Systems

62 Computers, Control Theory, Information Theory

A. Computer Hardware
B. Computer Software
C. Control Systems and Control Theory
D. Information Processing Standards
E. Information Theory

63 Detection and Countermeasures

A. Acoustic Detection
B. Electromagnetic and Acoustic Countermeasures
C. Infrared and Ultraviolet Detection
D. Magnetic Detection
E. Nuclear Explosion Detection
F. Optical Detection
G. Personnel Detection
H. Radiofrequency Detection
I. Seismic Detection

64 Earth Sciences

A. Cartography
B. Earth Resource Surveys
C. Geochemistry
D. Geodesy
E. Geography
F. Geology and Mineralogy
G. Geomorphology
H. Hydrology and Limnology
I. Mineral Industries
J. Seismology
K. Snow, Ice and Permafrost
L. Soil and Rock Mechanics

65 Economics, Business and Commerce

A. Banking and Finance
B. Economics and Monetary Policy
C. International Commerce
D. Manufacturing and Production
E. Marketing
F. Minority Enterprises and Employment Opportunities
G. Service Industries
H. Wholesale and Retail Trade

66 Electrotechnology

A. Antennas
B. Circuits
C. Electromechanical Devices
D. Electron Tubes
E. Optoelectronic Devices and Systems
F. Power and Signal Transmission Devices
G. Resistive, Capacitive and Inductive Components
H. Semiconductor Devices

67 Energy Conversion (Non-Propulsive)

A. Batteries and Components
B. Electric Power Production and Generation
C. Fuel Cells
D. Magnetohydrodynamic Generators
E. Miscellaneous Energy Conversion and Storage Techniques
F. Photoelectric and Photovoltaic Energy Conversion
G. Thermoelectric and Thermionic Energy Conversion

68 Environmental Pollution and Control

A. Air Pollution and Control
B. Noise Pollution and Control
C. Solid Wastes Pollution and Control
D. Water Pollution and Control

69 Industrial and Mechanical Engineering

A. Air Conditioning, Heating and Refrigeration Equipment
B. Bonding and Joining
C. Couplings, Fasteners and Joints
D. Fluidics and Fluerics
E. Hydraulic and Pneumatic Equipment
F. Industrial Engineering
G. Lighting Equipment
H. Machinery and Tools
I. Manufacturing Processes
J. Materials Handling
K. Metal Processing
L. Office and Household Equipment
M. Packaging and Containerization
N. Pumps, Filters, Pipes, Tubing, Fittings and Valves

70 Managerial and Information Sciences

A. Administration and Management
B. Information Sciences
C. Inventory Control
D. Management Information Systems
E. Personnel Management, Labor Relations and Manpower Studies
F. Reference Materials and Library Aids
G. Research Program Administration and Transfer of Technology

71 Materials Sciences

A. Ablative Materials and Ablation
B. Adhesives and Sealants
C. Carbon and Graphite
D. Ceramics, Refractories and Glass
E. Coatings, Colorants and Finishes
F. Composite Materials
G. Corrosion and Corrosion Inhibition
H. Elastomers
I. Fibers and Textiles
J. Iron and Iron Alloys
K. Lubricants and Hydraulic Fluids
L. Materials Degradation and Fouling
M. Miscellaneous Materials
N. Nonferrous Metals and Alloys
O. Plastics
P. Refractory Metals and Alloys
Q. Solvents, Cleaners and Abrasives
R. Wood and Paper Products

72 Mathematical Sciences

A. Algebra and Number Theory
B. Analysis(Mathematics)
C. Geometry
D. Mathematical Logic
E. Operations Research
F. Statistical Analysis

73 Methods, Instrumentation and Equipment

A. Metrology and Chronology
B. Nondestructive Testing
C. Reliability
D. Test Facilities, Equipment, Methods and Laboratories

74 Military Sciences

A. Antiaircraft Defense Systems
B. Antimissile Defense Systems
C. Antisubmarine Warfare
D. Chemical, Biological and Radiological Warfare
E. Civil Defense Systems
F. Logistics, Military Facilities and Supplies
G. Military Intelligence
H. Military Operations, Strategy and Tactics
I. Nuclear Warfare
J. Passive Defense Systems

75 Missile Technology

A. Air and Space-launched Missiles
B. Missile Guidance and Control Systems
C. Missile Launching and Support Systems
D. Missile Tracking Systems
E. Missile Trajectories and Reentry Dynamics
F. Missile Warheads and Fuzes
G. Surface-launched Missiles
H. Underwater-launched Missiles

76 Navigation, Guidance and Control

A. Control Devices and Equipment
B. Guidance Systems
C. Navigation and Guidance Systems Components
D. Navigation Systems

77 Nuclear Science and Technology

A. Fusion Devices (Thermonuclear)
B. Isotopes
C. Nuclear Auxiliary Power Systems
D. Nuclear Explosions and Devices
E. Nuclear Instrumentation
F. Radiation Shielding, Protection and Safety
G. Radioactive Wastes and Radioactivity
H. Reactor Engineering and Nuclear Power Plants
I. Reactor Fuels and Fuel Processing
J. Reactor Materials
K. Reactor Physics

78 Ocean Sciences and Engineering

A. Biological Oceanography
B. Chemical Oceanography
C. Dynamic Oceanography
D. Hydrography
E. Marine Geophysics and Geology
F. Oceanographic Instruments
G. Oceanographic Vessels and Platforms
H. Physical Oceanography
I. Underwater Habitats
J. Underwater Research Vehicles

79 Ordnance

A. Ammunition, Explosives and Pyrotechnics
B. Armor
C. Bombs
D. Combat Vehicles
E. Detonations, Explosive Effects and Ballistics
F. Fire Control and Bombing Systems
G. Guns
H. Rockets
I. Underwater Ordnance

80 Physics

A. Acoustics
B. Atomic and Molecular Physics
C. Cryogenic Phenomena
D. Crystallography
E. Electrical and Magnetic Phenomena
F. Fluid Mechanics
G. Lasers and Masers
H. Optical Phenomena and Equipment
I. Particle Accelerators
J. Particle and Nuclear Physics
K. Plasma Physics
L. Quantum Theory and Relativity
M. Radiofrequency Wave Propagation
N. Solid State Physics
O. Structural Mechanics
P. Thermodynamics

81 Propulsion and Fuels

A. Combustion and Ignition
B. Electric Propulsion and Photopropulsion
C. Fuel and Propellant Tanks
D. Fuels
E. Jet and Gas Turbine Engines
F. Liquid Propellant Rocket Engines
G. Liquid Rocket Propellants
H. Miscellaneous Rocket Engines and Motors
I. Miscellaneous Rocket Propellants
J. Nuclear Propulsion
K. Reciprocating and Rotating Combustion Engines
L. Solid Propellant Rocket Motors
M. Solid Rocket Propellants

82 Reprography and Recording Devices

A. Holography
B. Photographic Techniques and Equipment
C. Recording Devices
D. Reprography and Graphic Arts

83 Safety Engineering and Protection

A. Fire Protection and Detection Equipment
B. Protective Equipment and Clothing
C. Safety Engineering

84 Space Technology

A. Astronautics
B. Extraterrestrial Exploration
C. Manned Spacecraft
D. Spacecraft Trajectories and Flight Mechanics
E. Space Launch Vehicles and Support Equipment
F. Space Safety
G. Unmanned Spacecraft

85 Transportation

A. Air Transportation
B. Pipeline Transportation
C. Subsurface Transportation
D. Surface Transportation
E. Transportation Safety

May 1, 1974

SCIM CATEGORIES

45. COMMUNICATIONS

A. Policies, regulations, and studies
B. Radio and television equipment
C. Common carrier and satellite
D. Sociopolitical
E. Graphics
F. Verbal
G. Communication and information theory
H. General

46. PHYSICS

A. Acoustics
B. Fluid mechanics
C. Optics and lasers
D. Solid state physics
E. Structural mechanics
F. Nuclear technology, standards, and safety

9 Category includes Cryogenics, Plasma physics, Thermodynamics, Nuclear and theoretical physics, Particle physics, Quantum mechanics and relativity theory, Radiofrequency.

47. OCEAN TECHNOLOGY AND ENGINEERING

A. Marine engineering
B. Dynamic oceanography
C. Physical and chemical oceanography
D. Biological oceanography
E. Marine geophysics and geology
F. Oceanographic vessels, instruments, and platforms
G. Hydrography
H. Underwater construction and habitats

48. NATURAL RESOURCES

A. Mineral industries
B. Natural resource management
C. Natural resource surveys
D. Forestry
E. Soil sciences
F. Geology and geophysics
G. Hydrology and limnology

SCIM CATEGORIES (continued)

49. ELECTROTECHNOLOGY

A. Antennas
B. Circuits
C. Electromechanical devices
D. Electron tubes
E. Optoelectronic devices and systems
F. Power and signal transmission devices
G. Resistive, capacititive, and inductive components
H. Semiconductor devices

50. CIVIL AND STRUCTURAL ENGINEERING

A. Highway engineering
B. Civil engineering
C. Construction equipment, materials, and supplies
D. Soil and rock mechanics

51. AERONAUTICS AND AERODYNAMICS

A. Aerodynamics
B. Aeronautics
C. Aircraft (Exclusive of aircraft design for transportation)
D. Parachutes and decelerators

54. ASTRONOMY AND ASTROPHYSICS

A. Astrogeology
B. Astronomy and celestial mechanics
C. Astrophysics
D. Cosmic ray research

55. ATMOSPHERIC SCIENCES

A. Aeronomy
B. Dynamic meteorology
C. Meteorological data collection, analysis, and weather forecasting
D. Meteorological instruments and instrument platforms
E. Physical meteorology
F. Weather modification

57. MEDICINE AND BIOLOGY

A. Anatomy
B. Biochemistry

SCIM CATEGORIES (continued)

57. MEDICINE AND BIOLOGY (continued)

C. Botany
D. Clinical chemistry
E. Clinical medicine
F. Cytology, genetics, and molecular biology
G. Dentistry
H. Ecology
I. Electrophysiology
J. Immunology
K. Microbiology
L. Nutrition
M. Occupational therapy, physical therapy, and rehabilitation
N. Parasitology
O. Pathology
P. Pest control
Q. Pharmacology and pharmacological chemistry
R. Physiological psychology
S. Physiology
T. Psychiatry
U. Public health, hygiene, and industrial medicine
V. Radiobiology
W. Stress physiology
X. Surgery
Y. Toxicology
Z. Zoology

62. COMPUTERS, CONTROL AND INFORMATION THEORY

A. Computer hardware
B. Computer software
C. Control systems and control theory
D. Information processing standards
E. Information theory
F. Pattern recognition

63. DETECTION AND COUNTERMEASURES

A. Acoustic detection
B. Electromagnetic and acoustic countermeasures
C. Infrared and ultraviolet detection
D. Magnetic detection
E. Nuclear explosion detection
F. Optical detection
G. Personnel detection
H. Radiofrequency detection
I. Seismic detection

SCIM CATEGORIES (continued)

64. EARTH SCIENCES

A. Cartography
B. Snow, ice, and permafrost

68. ENVIRONMENTAL POLLUTION AND CONTROL

A. Air pollution and control
B. Noise pollution and control
C. Solid wastes pollution and control
D. Water pollution and control
E. Pesticides pollution and control
F. Radiation pollution and control
G. Environmental health and safety
H. Environmental impact statements — These are no longer available.

70. ADMINISTRATION

A. Inventory control
B. Management practice
C. Management information systems
D. Personnel management, labor relations, and manpower studies
E. Research program administration and technology transfer
F. Public administration and government

71. MATERIALS SCIENCES

A. Ablative materials and ablation
B. Adhesives and sealants
C. Carbon and graphite
D. Ceramics, refractories, and glass
E. Coatings, colorants, and finishes
F. Composite materials
G. Corrision and corrosion inhibition
H. Elastomers
I. Fibers and textiles
J. Iron and iron alloys
K. Lubricants and hydraulic fluids
L. Materials degradation and fouling
M. Miscellaneous materials
N. Nonferrous metals and alloys
O. Plastics
P. Refractory metals and alloys
Q. Solvents, cleaners, and abrasives
R. Wood and paper products

SCIM CATEGORIES (continued)

72. MATHEMATICAL SCIENCES

A. Algebra and number theory
B. Analysis (Mathematics)
C. Geometry
D. Mathematical logic
E. Operations research
F. Statistical analysis

73. NON-DESTRUCTIVE TESTING

A. Ultrasonic testing
B. Radiographic testing
C. Hydrostatic testing
D. Miscellaneous testing

74. MILITARY SCIENCES

A. Antiaircraft defense systems
B. Antimissile defense systems
C. Antisubmarine warfare
D. Chemical, biological, and radiological warfare
E. Logistics, military facilities, and supplies
F. Military intelligence
G. Military operations, strategy, and tactics
H. Nuclear warfare
I. Passive defense systems

75. MISSILE TECHNOLOGY

A. Air and space-launched missiles
B. Missile guidance and control systems
C. Missile launching and support
D. Missile tracking systems
E. Missile trajectories and reentry dynamics
F. Missile warheads and fuzes
G. Surface-launched missiles
H. Underwater-launched missiles

76. NAVIGATION, GUIDANCE AND CONTROL

A. Control devices and equipment
B. Guidance systems
C. Navigation and guidance system components
D. Navigation systems

SCIM CATEGORIES (continued)

77. NUCLEAR SCIENCE AND TECHNOLOGY

A. Fusion devices (Thermonuclear)
B. Isotopes
C. Nuclear auxiliary power systems
D. Nuclear explosions and devices
E. Nuclear instrumentation
F. Radiation shielding, protection, and safety
G. Radioactive wastes and radioactivity
H. Reactor engineering and nuclear power plants
I. Reactor fuels and fuel processing
J. Reactor materials
K. Reactor physics

79. ORDNANCE

A. Ammunition, explosives, and pyrotechnics
B. Armor
C. Bombs
D. Combat vehicles
E. Detonations, explosive effects, and ballistics
F. Fire control and bombing systems
G. Guns
H. Rockets
I. Underwater ordnance

81. PROPULSION AND FUELS

A. Combustion and ignition
B. Electric propulsion
C. Fuel and propellant tanks
D. Jet and gas turbine engines
E. Liquid propellant rocket engines
F. Liquid rocket propellants
G. Miscellaneous rocket engines and motors
H. Miscellaneous rocket propellants
I. Nuclear propulsion
J. Reciprocating and rotating combustion engines
K. Solid propellant rocket motors
L. Solid rocket propellants

82. PHOTOGRAPHY AND RECORDING DEVICES

A. Holography
B. Photographic techniques and equipment
C. Recording devices

SCIM CATEGORIES (continued)

84. SPACE TECHNOLOGY

A. Astronautics
B. Extraterrestrial exploration
C. Manned spacecraft
D. Spacecraft trajectories and flight mechanics
E. Space launch vehicles and support equipment
F. Space safety
G. Unmanned spacecraft

85. TRANSPORTATION

A. Air transportation
B. Surface transportation
C. Subsurface transportation
D. Transportation safety
E. Pipeline transportation
F. Global navigation systems

88. LIBRARY AND INFORMATION SCIENCES

A. Operations and planning
B. Information systems
C. Marketing and user services
D. Personnel
E. Reference materials

89. BUILDING TECHNOLOGY

A. Architectural design and program analysis
B. Environmental design
C. Construction
D. Structural analyses
E. Building standards
F. Building technology management
G. Construction materials and equipment

90. GOVERNMENT INVENTIONS FOR LICENSING

A. Mechanical devices and equipment
B. Chemistry
C. Nuclear technology
D. Biology and medicine
E. Metallurgy
F. Electrotechnology
G. Instruments

SCIM CATEGORIES (continued)

91. URBAN TECHNOLOGY

A. Environmental management and planning
B. Transportation and traffic planning
C. Public services
D. Communications
E. Housing planning and construction
F. Health services
G. Urban administration and planning
H. Urban-regional relationships
I. Emergency services
J. Economic planning

92. BEHAVIOR AND SOCIETY

A. Job training and career development
B. Organizational psychology
C. Social concerns
D. Education, law, and humanities
E. International relations

94. INDUSTRIAL AND MECHANICAL ENGINEERING

A. Production planning and process controls
B. Quality control and reliability
C. Plant design and maintenance
D. Job environment
E. Environmental engineering
F. Tooling, machinery, and tools
G. Manufacturing processes
H. Safety engineering

95. BIOMEDICAL TECHNOLOGY AND ENGINEERING

A. Prosthetics and mechanical organs
B. Tissue preservation and storage
C. Biomedical instrumentation and bioengineering
D. Human factors engineering
E. Life support systems
F. Bionics and artificial intelligence
G. Health care facilities and services

SCIM CATEGORIES (continued)

96. BUSINESS AND ECONOMICS

A. Business and economic conditions
B. Domestic commerce and marketing
C. International commerce and marketing
D. Consumer affairs
E. Minority enterprises
F. Banking and finance
G. Area development

97. ENERGY

A. Energy sources
B. Energy use, supply, and demand
C. Power and heat generation
D. Energy conversion and storage
E. Energy transmission
F. Fuel conversion processes
G. Policies, regulations, and studies
H. Engines and fuels

98. AGRICULTURE AND FOOD

A. Agricultural chemistry
B. Agricultural economics
C. Agricultural equipment, facilities, and operations
D. Agronomy, horticulture, and plant pathology
E. Animal husbandry and vetrinary medicine
F. Fisheries and aquaculture
G. Agricultural resource surveys
H. Food technology

99. CHEMISTRY

A. Analytical chemistry
B. Industrial chemistry and chemical process engineering
C. Polymer chemistry
D. Basic and synthetic chemistry
E. Photo and radiation chemistry
F. Physical and theoretical chemistry

APPENDIX I

PART C

PAGE 1 SRIM PRICE CHARTS FOR GOVERNMENT REPORTS TOPICAL ANNOUNCEMENTS - CAST - 11/12/74 SDM22
FOR THOSE WITH CROSS REFERENCE

CATEGORY	ALL TLES/PRICE		DOD (AD) TLES/PRICE		AEC TLES/PRICE		NASA TLES/PRICE		PB TLES/PRICE		PB---T TLES/PRICE		JPRS TLES/PRICE		TT TLES/PRICE	
45. COMMUNICATION	396/$	178	263/$	118	15/$	7	90/$	41	26/$	12	0/$	0	2/$	1	0/$	0
A. POLICIES, REGULATIONS AND STUDIES	7/$	3	2/$	1	0/$	0	1/$	0	4/$	2	0/$	0	0/$	0	0/$	0
B. RADIO AND TELEVISTION EQUIPMENT	47/$	21	34/$	15	4/$	2	8/$	4	1/$	0	0/$	0	0/$	0	0/$	0
C. COMMON CARRIER AND SATELLITE	254/$	114	156/$	70	9/$	4	73/$	33	14/$	6	0/$	0	2/$	1	0/$	0
D. SOCIOPOLITICAL	3/$	1	1/$	0	0/$	0	0/$	0	2/$	1	0/$	0	0/$	0	0/$	0
E. GRAPHICS	8/$	4	5/$	2	2/$	1	0/$	0	1/$	0	0/$	0	0/$	0	0/$	0
F. VERBAL	35/$	16	30/$	14	0/$	0	2/$	1	3/$	1	0/$	0	0/$	0	0/$	0
G. COMMUNICATION AND INFORMATION THEOR	30/$	14	25/$	11	0/$	0	4/$	2	1/$	0	0/$	0	0/$	0	0/$	0
H. GENERAL	1/$	0	1/$	0	0/$	0	0/$	0	0/$	0	0/$	0	0/$	0	0/$	0
46. PHYSICS	2736/$	1231	1265/$	569	766/$	345	640/$	288	63/$	28	0/$	0	2/$	1	0/$	0
A. ACOUSTICS	126/$	57	77/$	35	2/$	1	40/$	18	7/$	3	0/$	0	0/$	0	0/$	0
B. FLUID MECHANICS	535/$	241	259/$	116	30/$	14	228/$	103	19/$	9	0/$	0	0/$	0	0/$	0
C. OPTICS AND LASERS	541/$	243	323/$	145	101/$	45	110/$	50	6/$	3	0/$	0	1/$	0	0/$	0
D. SOLID STATE PHYSICS	716/$	322	285/$	128	362/$	163	62/$	28	7/$	3	0/$	0	0/$	0	0/$	0
E. STRUCTURAL MECHANICS	269/$	121	120/$	54	29/$	13	106/$	48	14/$	6	0/$	0	0/$	0	0/$	0
F. NUCLEAR TECHNOLOGY, STANDARDS AND SAFETY	22/$	10	0/$	0	21/$	9	1/$	0	0/$	0	0/$	0	0/$	0	0/$	0
G. MISCELLANEOUS	0/$	0	0/$	0	0/$	0	0/$	0	0/$	0	0/$	0	0/$	0	0/$	0
47. OCEAN TECHNOLOGY AND ENGINEERING	562/$	253	420/$	199	17/$	8	43/$	22	71/$	32	0/$	0	5/$	2	1/$	0
A. MARINE ENGINEERING	161/$	72	149/$	67	0/$	0	3/$	1	8/$	4	0/$	0	1/$	0	0/$	0
B. DYNAMIC OCEANOGRAPHY	108/$	49	82/$	37	3/$	1	9/$	4	12/$	5	0/$	0	1/$	0	1/$	0
C. PHYSICAL AND CHEMICAL OCEANOGRAPHY	160/$	72	99/$	45	9/$	4	29/$	13	23/$	10	0/$	0	0/$	0	0/$	0
D. BIOLOGICAL OCEANOGRAPHY	25/$	11	13/$	6	4/$	2	3/$	1	5/$	2	0/$	0	0/$	0	0/$	0
E. MARINE GEOPHSICS AND GEOLOGY	40/$	18	24/$	11	1/$	0	0/$	0	15/$	7	0/$	0	0/$	0	0/$	0
F. OCEANOGRAPHIC VESSELS, INSTRUMENTS, AND PLATFORMS	35/$	16	27/$	12	0/$	0	3/$	1	4/$	2	0/$	0	1/$	0	0/$	0

SUBCATEGORIES MAY OR MAY NOT TOTAL UP TO THE CATEGORY.

APPENDIX II

COMPARISON OF GRA DATES, PACKING LIST DATES, AND DATES OF RECEIPT (14 SHIPMENTS)

Column 1: Shipment number
Column 2: Number of documents received
Column 3: Packing list dates minus GRA dates (days)
Column 4: GRA-received dates minus GRA dates "
Column 5: Shipment-received dates minus packing list dates "

(Negatives in parentheses)

1	2	3	4	5
74-25	(AD) 130	-0-	107	25
74-26	(AD) 147	4	25	16
75-01	(AD) 83	4	115	14
75-02	(AD) 141	-0-	101	11
75-03	(AD) 101	(6)	8	31
75-04	(AD) 70	-0-	41	24
75-05	(AD) 90	5	72	13
75-06	(AD) 181	1	5	35
75-07	(AD) 108	1	17	30
75-08	(AD) 164	(1)	20	31
75-09	(AD) 139	1	32	35
75-10	(AD) 115 (PB) 132	(1)	40	40
75-11	(AD) 95 (PB) 232	-0-	26	-
75-12	(AD) 132 (PB) 377	3	26	-
Totals	AD 1696 PB 741 2437			
Range		(6) - 5	5 - 115	11 - 40
Mean		0	45	25
Median		0+	40	28

APPENDIX III

PRODUCTION

A. The attached "Procedures for Processing SRIM Shipments" was developed as a training document for clerical personnel responsible for making microfiche copies and distributing them. The routine has proven effective over the period of the project, but should not be taken as the only feasible procedure. In the case of a very small shipment, for example, some of the steps can be combined. There are a number of alternatives that an experienced worker may find preferable, such as marking the number of copies to be made on the original microfiche jacket rather than on the tally list as specified in paragraph 3. The sample forms normally attached to this document have been omitted.

B. All copying was done on an Atlantic fiche-to-fiche planetary exposure unit and developer, using diazo film. Exposures were made "2-up", as we found this to be optimum, rather than trying to expose 3 or 4 at a time. On this basis, we established a rate of 85 seconds per pair, including all handling but excluding time in the developer unit, which has continuous throughput and thus does not affect batch rate.

In June, 1975, we acquired a rotary exposure unit (NB Printer 404A), but not in time to test it in this operation. Since this machine provides continuous throughput, the same as the developer unit, one would expect that the production rate, including handling time, would be somewhat faster.

It is necessary that copying proceed with as few distractions as possible, to minimize error.

C. The cost of producing one fiche copy is estimated as follows:

Materials		
Film		$ 0.040
Envelopes		0.025
Ammonia		nominal
Equipment		
Depreciation and Maintenance		nominal
Labor	(89[S] @ $6/hr)	0.149
		$ 0.214

Note that the optimum time per fiche has been doubled, and a liberal hourly rate has been used, to provide for training, supervision, and slippage.

D. A typical shipment was found to include the following proportions of multi-fiche documents and singles:

	Number of Documents	Number of Fiches
Singles	109	109
2's	20	40
3's	6	18
4's	2	8
5's	1	5
6's	1	6
7's	2	14
Totals	141	200

Average: 1.42

This factor, applied to the cost of film and labor, above gives us an average cost per document of $0.268.

PROCEDURES FOR PROCESSING SRIM SHIPMENTS

1. INFORMATION

SRIM shipments are received from NTIS approximately every two weeks, and are delivered to Systems by the mail clerk. Each shipment contains several hundred documents on microfiche, and a packing list setting forth the following information:

- *a. Our name and account number.*
- *b. The number of the Government Research Announcements (GRA) issue covering the shipment (e.g., 75-12). We refer to this as the "shipment number".*
- *c. The date of the packing list (presumably the shipping date).*
- *d. For each document:*
  - *1. the accession number,*
  - *2. the category number ("GRP"), and*
  - *3. the "slot" number (this we ignore).*
- *e. Documents are listed in numerical sequence by accession numbers, reading across the page, line by line (not down columns). There are one or more separate sequences, such as "ADA", "PB", etc., and these prefixes are always used when referring to the documents. In the "PB" listing, there is always an extra digit tacked on at the end of the listed accession number. This is a computer check digit and should be ignored. It does not appear on the document itself.*
- *f. At the end of the packing list there is a recap of the number of documents shipped, the number of pages making up the packing list, and the total cost.*

2. ACTION

Enter on log form the following information as soon as a shipment is received:

- *a. Shipment number ("GRA Journal" number).*
- *b. The highest "ADA" number in the shipment.*
- *c. The highest "PB" number in the shipment, etc.*
- *d. Total number of documents.*
- *e. Total cost.*
- *f. Packing list date.*
- *g. Date shipment received.*

Put shipment and packing list aside together until ready for further processing.

3. INFORMATION

The documents on microfiche are comprised of one or more separate fiches in a single yellow envelope. In our statistical record we must carefully distinguish between the number of "document copies" made and the number of "fiche copies" made (which is always larger). It is important that both statistics be accumulated in order to give us a better grasp of actual costs.

We have a tabulation of personal "profiles" indicating, for each user of the service, the categories of document subject matter in which he is interested. From this tabulation we derive a summary table which tells us how many copies of each document in the various categories must be made in order to satisfy all the individual profiles. It is this information that needs to be entered on the packing list or on the jackets containing the originals as the next step in processing. (Note that we can't apply it directly to the documents themselves, because the documents do not reveal their category numbers.)

4. ACTION

With the summary table in hand, enter the number of copies to be made of each document to the left of its category number on the packing list. The best way to do this is as follows:

a. Starting with the lowest number in the summary table, scan the entire list for that number, and wherever found, mark down the number of copies to be made.
b. For each such entry, make a tally on a sheet of scratch paper, and when the end of the list is reached, enter this tally - in pencil - on the summary sheet. In this way we advance two functions simultaneously: processing of the packing list and accumulation of statistics.
c. Go to the next number in the summary table and repeat a and b.
d. After a bit of practice, one is ready to handle groups of category numbers. For example, one can set up a scratch tally for categories 68A, 68B, 68C, and 68D as follows, putting the copy requirements above the category letters as shown:

	5	4	5	5
68	A	B	C	D
	𝍸	II		𝍸 III

(By taking the category numbers in sequence, one is better able to spot earlier missed numbers.)

e. *Check remaining blanks for missed items. There may be a residue of out-of-profile categories shipped in error or shipped before NTIS is able to give effect to profile changes. For these items, enter a simple dash opposite the category number, meaning no copies are to be made.*

f. *Now, with the packing list in hand, go through the entire shipment and mark on the jacket of each document the category number and the number of copies to be made. At the same time, watch for documents consisting of more than one fiche. (See upper left corner of heading, where the indication "1 of 1", or "1 of 2", etc. appears.) For all multi-fiche documents, write the second number - in red - immediately following the document number on the packing list.*

g. *Pull all out-of-profile documents (indicated by dash), count them, and bundle them for return shipment, with a slip to indicate the total number, and the incoming shipment number.*

h. *Add the numbers of document copies required, as shown on the packing list, and enter the total on the last page thereof.*

i. *Add the numbers of fiche copies required, as shown on the packing list (this calls for a quick multiplication when you reach a red number). Enter the total on the last page.*

j. *File the packing list in the binder provided.*

5. *INFORMATION*

The next step is to produce the required copies and prepare to distribute them. Instructions for operation of the fiche-to-fiche copier are posted near the machine. "LRC Microcopy Service" jackets are provided. Distribution envelopes (one for each distributee) are provided, each bearing a name, a sample inter-office mailing label, and a list of categories making up the profile for that person.

6. *ACTION*

a. *Proceed to make copies as required, batching a dozen or so documents at a time, so as to have ample flexibility in handling multi-fiche documents efficiently. Generally speaking, it is practical to run two fiche at a time through the exposure unit and the developer unit, provided one does not get confused as to which original came from which yellow jacket. If this proves to be a problem, jot the last three digits of the document number on the jacket before removing the fiche(s) for copying.*

b. *Place document copies in "LRC Microcopy Service" jackets.*
c. *After enough copies of a document have been made, check the category number of the document as shown on the yellow jacket of the original against the detailed profile tabulation and distribute all copies of the document to the personal envelopes. File any extras in the same jackets as the originals.*
d. *Return original to yellow jacket, along with any extra copies made by mistake. Batch file yellow jackets and their contents in the LRC collection of NTIS microfiches.*

7. *INFORMATION*

Speed is essential in processing shipments and getting document copies into the hands of distributees. NTIS is usually about three GRA issues behind in its own distributions, and we don't want to add to this lag any more than absolutely necessary.

8. *ACTION*

As soon as all documents in a shipment have been processed as provided in the foregoing paragraphs, the documents should be hand delivered. Besides being fast, this is a good way of learning of any problems experienced by users, changes in their interests, etc., and this information should be relayed to the Service Supervisor immediately.

Log the time of completion of deliveries in the last column of the summary table.

APPENDIX IV

PROFILES, RECEIPTS, AND RETURNS

This appendix consists of tabulations of various aspects of profiles, documents received and processed, and documents returned to the project office, set forth in the following attachments:

A. *Composite profile in classed order, showing the duplication requirement for each subcategory, together with the number of documents received in each (9 shipments)*

B. *Composite profile in rank order by number of documents received (9 shipments)*

C. *Merge of Attachments A and B by category, showing fraction of each category used.*

D. *Breakdown of 9 shipments by subcategories in rank order of duplication requirements*

E. *Record of retention of microfiche documents (5 shipments) leading to revision of individual profiles*

F. *Comparison of volume of requests, retention, cancellation, etc., between participants in EAS and in other colleges and support units*

G. *Detailed Profile Chart.*

ATTACHMENT A

COMPOSITE PROFILE IN CLASSED ORDER

Categories and Subcategories		Duplication Requirements (showing revisions)		Documents Received, 9 Shipments
45	COMMUNICATIONS			
45G	Communications & Information Theory	1		20
47	OCEAN TECHNOLOGY & ENGINEERING			
47D	Biological Oceanography	1		3
47E	Marine Geophysics and Geology	2		5
48	NATURAL RESOURCES			
48B	Natural Resource Management	1		13
48C	Natural Resource Surveys	2	(1)	7
48D	Forestry	1		4
48E	Soil Sciences	1		1
48F	Geology & Geophysics	1	(0)	60
48G	Hydrology & Limnology	1		8
49	ELECTROTECHNOLOGY			
49E	Optoelectronic Devices & Systems	3	(0)	12
55	ATMOSPHERIC SCIENCES			
55B	Dynamic Meteorology	1		23
55C	Meteorological Data Collection, Analysis, & Weather Forecasting	1	(0)	57
55D	Meteorological Instruments & Instrument Platforms	1		22
55E	Physical Meteorology	1		26
55F	Weather Modification	1		4
57	MEDICINE AND BIOLOGY			
57C	Botany	1		6
57D	Clinical Chemistry	1		10
57H	Ecology	5	(3)	10
57K	Microbiology	1		26
57M	Occupational Therapy, Physical Therapy & Rehabilitation	2		0
57P	Pest Control	2		5
57Q	Pharmacology & Pharmacological Chemistry	1		21
57R	Physiological Psychology	2		30
57S	Physiology	1		28
57T	Psychiatry	2		0
57W	Stress Physiology	2	(1)	51
57X	Toxicology	1		20
57Z	Zoology	1	(0)	24
62	COMPUTERS, CONTROL & INFORMATION THEORY			
62E	Information Theory	1		13
68	ENVIRONMENTAL POLLUTION & CONTROL			
68A	Air Pollution & Control	4	(2)	10
68B	Noise Pollution & Control	2	(0)	20
68C	Solid Wastes Pollution & Control	3		8
68D	Water Pollution & Control	5		42

Note: Numbers in parentheses indicate revised requirement

Categories and Subcategories		Duplication Requirements (showing revisions)		Documents Received, 9 Shipments
70	ADMINISTRATION			
70E	Research Program Administration & Technology Transfer	1		14
70F	Public Administration & Government	1		7
72	MATHEMATICAL SCIENCES			
72E	Operations Research	1		75
72F	Statistical Analysis	1	(0)	98
74	MILITARY SCIENCES			
74F	Military Intelligence	1		4
82	PHOTOGRAPHY AND RECORDING DEVICES			
82A	Holography	2		5
82B	Photographic Techniques & Equipment	1		11
88	LIBRARY AND INFORMATION SCIENCES			
88A	Operations and Planning	1		2
88B	Information Systems	1		1
88E	Reference Materials	2		6
91	URBAN TECHNOLOGY			
91A	Environmental Management & Planning	3		3
91B	Transportation & Traffic Planning	1		11
91E	Housing Planning & Construction	1		5
91G	Urban Administration & Planning	2		4
91H	Urban-Regional Relationships	1		11
92	BEHAVIOR & SOCIETY			
92A	Job Training and Career Development	1		45
92C	Social Concerns	2		26
92E	International Relations	1	(0)	16
95	BIOMEDICAL TECHNOLOGY & ENGINEERING			
95G	Health Care Facilities & Services	2		7
98	AGRICULTURE & FOOD			
98A	Agricultural Chemistry	1		0
99	CHEMISTRY			
99A	Analytical Chemistry	2		49
99E	Photo & Radiation Chemistry	1		3
99F	Physical and Theoretical Chemistry	1		0
(18 categories, 56 subcategories)	TOTALS	87 (Revised: 71)		998

ATTACHMENT B

COMPOSITE PROFILE IN RANK ORDER
BY NUMBER OF DOCUMENTS RECEIVED

RANK	CODE	DESIGNATION	DOCUMENTS
1	72F	Statistical Analysis	98
2	72E	Operations Research	75
3	48F	Geology and Geophysics	60
4	55C	Meteorological Data Collection, Analysis, and Weather Forecasting	57
5	57W	Stress Physiology	51
6	99A	Analytical Chemistry	49
7	92A	Job Training and Career Development	45
8	68D	Water Pollution and Control	42
9	57R	Physiological Psychology	30
10	57S	Physiology	28
11	55E	Physical Meteorology	26
12	57K	Microbiology	26
13	92C	Social Concerns	26
14	57Z	Zoology	24
15	55B	Dynamic Meteorology	23
16	55D	Meteorological Instruments and Instrument Platforms	22
17	57Q	Pharmacology and Pharmacological Chemistry	21
18	45G	Communications and Information Theory	20
19	57Y	Toxicology	20
20	68B	Noise Pollution and Control	20
21	49E	Optoelectronic Devices and Systems	18
22	92E	International Relations	16
23	70E	Research Program Administration and Technology Transfer	14
24	48B	Natural Resource Management	13
25	62E	Information Theory	13
26	82B	Photographic Techniques and Equipment	11
27	91B	Transportation and Traffic Planning	11
28	91H	Urban-Regional Relationships	11
29	57D	Clinical Chemistry	10
30	57H	Ecology	10
31	68A	Air Pollution and Control	10
32	48G	Hydrology and Limnology	8
33	68C	Solid Wastes Pollution and Control	8
34	48C	Natural Resource Surveys	7
35	70F	Public Administration and Government	7
36	95G	Health Care Facilities and Services	7
37	57C	Botany	6
38	88E	Reference Materials	6
39	47E	Marine Geophysics and Geology	5
40	57P	Pest Control	5
41	82A	Holography	5
42	91E	Housing Planning and Construction	5
43	48D	Forestry	4
44	55F	Weather Modification	4

RANK	CODE	DESIGNATION	DOCUMENTS
45	74F	Military Intelligence	4
46	91G	Urban Administration and Planning	4
47	47D	Biological Oceanography	3
48	91A	Environmental Management and Planning	3
49	99E	Photo and Radiation Chemistry	3
50	88A	Operations and Planning	2
51	48E	Soil Sciences	1
52	88B	Information Systems	1
53	57M	Occupational Therapy, Physical Therapy, and Rehabilitation	0
54	98A	Agricultural Chemistry	0
55	99F	Physical and Theoretical Chemistry	0
56	57T	Psychiatry	0
		Total	998

ATTACHMENT C

MERGE OF ATTACHMENTS A AND B BY CATEGORY

RANK	CODE	DESIGNATION	SET[1]	DOCUMENTS
1	57	Medicine and Biology	13/26	231
2	72	Mathematical Sciences	2/6	173
3	55	Atmospheric Sciences	5/6	132
4	48	Natural Resources	6/7	93
5	92	Behavior and Society	3/5	87
6	68	Environmental Pollution and Control	4/8	80
7	99	Chemistry	1/6	49
8	91	Urban Technology	5/10	34
9	70	Administration	2/6	21
10	45	Communications	1/8	20
11	49	Electrotechnology	1/8	18
12	82	Photography and Recording Devices	2/3	16
13	62	Computers, Control and Information Theory	1/6	13
14	88	Library and Information Science	3/5	9
15	47	Ocean Technology and Engineering	2/8	8
16	95	Biomedical Technology and Engineering	1/7	7
17	74	Military Sciences	1/9	4
18	98	Agriculture and Food	3/8	3
19-38	50, 51, 54, 63, 64, 71, 73, 75, 76, 77, 79, 81, 84, 85, 89, 90, 94, 96, 97	Unused	0/n	0
		TOTAL		998

[1] Number of subcategories used/number of subcategories in category

ATTACHMENT D

BREAKDOWN OF 9 SHIPMENTS BY SUBCATEGORIES
IN RANK ORDER OF DUPLICATION REQUIREMENT

NOTE: (1) *Numbers in parentheses indicate documents received before cancellations could take effect; not copied; not included in totals.*

(2) *Extensions are adjusted to give effect to reductions in duplication requirement (not complete cancellations).*

(3) *Total "documents received" is less than shown in other attachments, because of adjustments.*

Duplication requirement	Subcategory	Documents received in shipment --- 74-25	74-26	75-01	75-02	75-03	75-04	75-05	75-06	75-07	Totals	Extensions
1	48G		1	1	2	2		2			8	8
1	55B	1	3	3	3	3	1	2	7		23	23
1	55C	9	5	5	13	10	(2)	(6)	(7)	(3)	42	42
1	55D		2	1	6	1	3	4	4	1	22	22
1	55E	6	3	1	4	2	3	2	3	2	26	26
1	55F	1					1	2			4	4
1	57C			1	3		1		1		6	6
1	57D	2	1	1		1	1		2	2	10	10
1	57K	1			1	4	2	9	3	6	26	26
1	57Q		2		2	2	2	1	9	3	21	21
1	57S	1	4	1	3		1	2	12	4	28	28
1	57Y	3	3	2	3	2	5	1		1	20	20
1	57Z		5	1	2	1	(2)	(1)	(6)	(6)	9	9
1	62E		4		2	1	1	1	3	1	13	13
1	70E		1	1	3		2		4	3	14	14
1	70F	2			3	2					7	7
1	72E	9	17	5	12	6	3	6	11	6	75	75
1	72F	12	15	11	10	12	(2)	(13)	(74)	(9)	60	60
1	74F	1	1				1	1			4	4
1	82B	3	1	3	1			1	1	1	11	11
1	88A					2					2	2
1	88B					1					1	1
1	91B	2	2		1	1		2	3		11	11
1	91E					4				1	5	5
1	91H		2	7				2			11	11
1	92A	6	2	3	7	5	6	4	2	10	45	45
1	92E	2	3	3	2	1	(2)	(1)		(2)	11	11
1	98A										0	0
1	98E	2								1	3	3
1	98F										0	0
36	36	74	97	60	100	68	34	45	74	45	597	597
87	56	127	142	79	136	99	56	67	113	72	891	1341

Duplication requirement	Subcategory	Documents received in shipment --- 74-25	74-26	75-01	75-02	75-03	75-04	75-05	75-06	75-07	Totals	Extensions
5	68D	8	5	4	4	2	1	4	7	7	42	210
5	57H	1	3	1	1	1	1		2		10	46
4	68A				2	6		1		1	10	36
3	49E	2	5	1	1		(1)		(6)	(2)	9	17
3	68C	1			2	2	3				8	24
3	91A	1				2					3	9
2	47E		1	1						5	5	10
2	48C	3		1		1		2			7	14
2	57M										0	0
2	57P						3	1		1	5	10
2	57R	5	5	1	6		4	2	3	4	30	60
2	57U		1						1	1	3	6
2	57W	7	6	2	4	4	6	4	15	3	51	80
2	68B	6	6		1	1		(1)	(2)	(3)	14	28
2	82A		2					2	1		5	10
2	88E		1		2				3		6	12
2	91G	2				1		1			4	8
2	92C	5	2		6	4	3	2	1	3	26	52
2	95G	2			3	2					7	14
2	99A	10	8	8	4	5	1	3	6	4	49	98
51	20	53	45	19	36	31	22	22	39	27	294	744
1	45G	5	2	1	2		1		7	2	20	20
1	47D		1		1					1	3	3
1	48B	1	3		4	2		2	1		13	13
1	48D		2					1		1	4	4
1	48E				1						1	1
1	48F	5	12	9	9	3	(4)	(3)	(18)	(6)	38	38

ATTACHMENT E

RECORD OF RETENTION OF MICROFICHE DOCUMENTS LEADING TO REVISION OF INDIVIDUAL PROFILES

Column 1: User Code
Column 2: Affiliation
Column 3: Number of Subcategories Requested
Column 4: Documents - 5 Shipments: 74-25 through 75-03
  a. Distributed
  b. Retained
Column 5: Percent Retained
Column 6: Subcategories
  a. Dropped
  b. Remaining

1	2	3	4 a	4 b	5	6 a	6 b
A	EAS	10	96	92	95.8	0	10
B	EAS	9	80	22	27.5	4	5
C	EAS	8	22	16	72.7	3	5
D	EAS	7	88	49	55.7	1	6
E	EAS	7	80	72	90.0	0	7
F	EAS	7	89	88	99.0	1	6
G	EAS	4	18	14	77.8	0	4
H	EAS	3	27	27	100.0	0	3
I	EAS	3	8	8	100.0	0	3
J	EAS	3	8	8	100.0	0	3
K	Other	3	11	11	100.0	0	3
L	EAS	3	5	5	100.0	1	2
M	EAS	2	56	40	71.0	0	2
N	Other	2	5	5	100.0	0	2
O	Other	2	77	65	84.0	0	2
P	Other	2	13	13	100.0	0	2
Q	EAS	2	16	2	12.5	2	0
R	EAS	2	--	--	--	2	0
S	EAS	1	--	--	--	0	1
T	EAS	1	23	23	100.0	0	1
U	EAS	1	0	n.a.	n.a.	0	1
V	Other	1	2	2	100.0	0	1
W	Other	1	3	3	100.0	0	1
X	Other	1	2	2	100.0	0	1
Y	Other	1	--	--	--	1	0
Z	Other	1	41	4	9.7	1	0
26	17 EAS 9 Other	87	770	571	74.1%	16	71

ATTACHMENT F

COMPARISON OF VOLUME OF REQUESTS, RETENTION, CANCELLATIONS, ETC. BETWEEN PARTICIPANTS IN EAS AND IN OTHER COLLEGES AND SUPPORT UNITS

ITEM	EAS	OTHER	TOTAL
a. Participants	17 (65.4%)	9 (34.6%)	26 (100.0%)
b. Number of Subcategories Requested	73 (83.9%)	14 (16.1%)	87 (100.0%)
c. Documents Distributed	616 (80.0%)	154 (20.0%)	770 (100.0%)
d. Documents Retained	466 (81.6%)	105 (18.4%)	571 (100.0%)
Percentage of c	75.6%	68.2%	74.2%
e. Participants Dropped	2	2	4
Percentage of a	11.8%	22.2%	15.4%
f. Separate Requests Dropped	14	2	16
Percentage of b	19.1%	14.3%	18.3%
g. Separate Requests After Revision	60 (83.3%)	12 (16.7%)	71 (100.0%)

ATTACHMENT G

DETAILED PROFILE CHART

User	45G	47D	47E	48B	48C	48D	48E	48F	48G	49E	55B	55C
A					x		x		x			
B					x							
C										x		
D						x					x	x
E												
F				x								
G												
H		x	x									
I												
J												
K												
L			x					x				
M												
N												
O												
P	x											
Q										x		
R										x		
S												
T												
U												
V												
W												
X												
Y												
Z												
Original	1	1	2	1	2	1	1	1	1	3	1	1
Revised	1	1	2	1	1	1	1	0	1	0	1	0
	45G	47D	47E	48B	48C	48D	48E	48F	48G	49E	55B	55C

(Continuation)

User	55D	55E	55F	57C	57D	57H	57K	57M	57P	57Q	57R	57S
A						x	x					
B				x		x			x			
C												
D	x	x	x									
E					x	x				x	x	x
F						x					x	
G												
H												
I								x				
J								x				
K												
L												
M												
N												
O												
P												
Q						x						
R												
S									x			
T												
U												
V												
W												
X												
Y												
Z												
Original	1	1	1	1	1	5	1	2	2	1	2	1
Revised	1	1	1	1	1	3	1	2	2	1	2	1

	55D	55E	55F	57C	57D	57H	57K	57M	57P	57Q	57R	57S

(Continuation)

User	57U	57W	57Y	57Z	62E	68A	68B	68C	68D	70E	70F	72E
A						x		x	x			
B				✗		x	✗	x	x			
C						✗	✗	x	x			
D												
E		x	x									
F		✗										
G												
H									x			
I	x											
J	x											
K					x							
L												
M									x			x
N										x		
O											x	
P												
Q												
R						✗						
S												
T												
U												
V												
W												
X												
Y												
Z												
Original	2	2	1	1	1	4	2	3	5	1	1	1
Revised	2	1	1	0	1	2	0	3	5	1	1	1

	57U	57W	57Y	57Z	62E	68A	68B	68C	68D	70E	70F	72E

(Continuation)

User	72F	74F	82A	82B	88A	88B	88E	91A	91B	91E	91G	91H
A												
B												
C			x	x								
D								x				
E												
F								x				
G								x	x	x		x
H												
I												
J												
K						x					x	
L												
M												
N							x					
O												
P			x									
Q												
R												
S												
T												
U												
V		x										
W							x					
X					x							
Y												
Z	x											
Original	1	1	2	1	1	1	2	3	1	1	2	1
Revised	0	1	2	1	1	1	2	3	1	1	2	1

	72F	74F	82A	82B	88A	88B	88E	91A	91B	91E	91G	91H

(Continuation)

User	92A	92C	92E	95G	98A	98E	98F	99A	Original	Revised
A					x			x	10	10
B									9	5
C								x	8	5
D									7	6
E									7	7
F		x				x			7	6
G									4	4
H									3	3
I				x					3	3
J				x					3	3
K									3	3
L									3	2
M									2	2
N									2	2
O		x							2	2
P									2	2
Q									2	0
R									2	0
S									1	1
T	x								1	1
U							x		1	1
V									1	1
W									1	1
X									1	1
Y			x						1	0
Z									1	0
Original	1	2	1	2	1	1	1	2	87	
Revised	1	2	0	2	1	1	1	2		71

	92A	92C	92E	95G	98A	98E	98F	99A

APPENDIX V.

SURVEY OF USERS

A. DESIGN AND ADMINISTRATION OF SURVEY

The survey instrument (Attachment 1) was designed to elicit subjective responses to a number of inter-related questions bearing on expectations, relevance threshholds, and work habits. It also sought to detect indications of the level of understanding of the nature of the file, as a factor to be taken into account in connection with specific criticisms.

The survey was administered personally by the principal investigator, whenever possible. Of the twenty-three potential respondents, only one failed to cooperate, and the base number for fractions and percentages has been reduced accordingly. Another participant received no documents whatever during the period covered by the survey, and was not interviewed, but this did not serve to reduce the base number.

B. ANALYSIS

In analyzing the responses to questions posed in the survey, it has seemed worthwhile to differentiate between the group of respondents to be found in the College of Environmental and Applied Science (EAS) and "others," i.e., those found in other colleges and in support units. Both groups include both administrators and scientists or technicians, but the former is more consistently in need of the kind of technical information available through NTIS, as attested by the fact that its fifteen members separately subscribed to 73 subcategories (revised to 60 in March, 1975,) an average of 5 (to 4), as compared with seven "others" subscribing separately to only 12 subcategories (no revision), an average of 1.7. Even so, the perceptions of both groups were remarkably similar in certain areas. Both groups exhibited a wide range of subjective criteria, which more intensive orientation might have narrowed somewhat, or which might have been normalized had larger sets been involved.

The following sections are keyed to the questions appearing in the sample form (Attachment 1).

1. THE EXTENT TO WHICH USERS RELIED ON THE EYE-LEGIBLE HEADING IN DECIDING WHETHER TO RETAIN A MICROFICHE DOCUMENT.

Entirely:

EAS	*4/15*
Other	*5/7*
Total	*9/22*

Entirely, except for non-informative titles:

EAS	2/15
Other	0/7
Total	2/22

Partially, about _____%:

EAS	6/15	(40 - 90%)
Other	2/7	(20%)
Total	8/22	(20 - 90%)

2. *FOLLOWING DISTRIBUTION, WHAT PERCENTAGE OF MICROFICHE ARE CHECKED ON A READER WITHIN 2 WEEKS? WITHIN 6 WEEKS? WHAT PERCENTAGE ARE FILED WITHOUT READING?*

_____% checked within 2 weeks:

EAS	3/15	(60 - 100%)
Other	4/7	(25 - 100%)
Total	4/22	(25 - 100%)

Additionally, _____% within six weeks:

EAS	3/15	(60 - 100%)
Other	1/7	(50%)
Total	4/22	(50 - 100%)

_____% filed without reading:

EAS	7/15	(25 - 90%)
Other	4/7	(20%)
Total	8/22	(20 - 90%)

All filed without reading:

EAS	3/15
Other	4/7
Total	7/22

3. *AFTER BEING CHECKED IN A READER, WHAT PORTION IS USUALLY RETAINED?*

(Note: This is a checking and directive question. The weighted averages given in Appendix ___ are more accurate.)

EAS	12/15	(10 - 100%)*
Other	4/7	(50 - 100%)**
Total	16/22	(10 - 100%)***

* *Six say "all"; the other six average 48%, with a median of 50%.*
** *Two say "all"; the other two say "50."*
*** *The true range is 9.7% - 100%.*

4. *HOW ARE MICROFICHES THAT ARE NOT RETAINED DISPOSED OF?*

_____% *are returned to the Learning Resources Center (LRC):*

EAS	7/15*	(30 - 100%)
Other	1/7	(80%)
Total	8/22	(30 - 100%)

* *Actually, 10/15 returned some microfiches to LRC.*

_____% *were passed to a colleague:*

EAS	8/15	(40 - 100%)
Other	2/7	(80 - 100%)
Total	10/22	(40 - 100%)

_____% *were discarded:*

EAS	2/15	(30 - 40%)	
Other	5/7	(20 - 100%)	(3/7 @ 100%)
Total	7/22	(20 - 100%)	

5. *PERCENTAGE OF DOCUMENTS FOUND TO BE RELEVANT.*

		Range	Average	Median
EAS	12/15	10 - 100%	44%	40%
Other	6/7	2 - 100%	50%	50%
Total	18/22	2 - 100%	46%	50%

6. *SCANNING THRESHHOLD. ("How many irrelevant titles are you willing to glance at on the chance of identifying one title of immediate or potential interest to you?" This question is designed to provide a check on responses to number 7 below.)*

		Range	Average	Median
EAS	10/15*	4 - 100	24	18
Other	4/7*	10 - 20	15	15
Total	14/22	4 - 100		

* *The following responses were not included in the tally:*

1 - "all"
3 - "many"
1 - "none" (not confirmed by next response)
1 - "100 initially, going down to 5 if I am repeatedly disappointed."

7. *WHAT DO USERS CONSIDER TO BE AN ACCEPTABLE RELEVANCE/IRRELEVANCE RATIO, EXPRESSED IN PERCENTAGES?*

Required relevance:

	Range	Average	Median
EAS 12/15	5 - 50%	18%	17%
Other 5/7	10 - 93%	43%	30%
Total 17/22	5 - 93%	26%	20%

Acceptable irrelevance:

	Range	Average	Median
EAS 12/15	10 - 90%	52%	55%
Other 6/7	5 - 90%	49%	47%
Total 18/22	5 - 90%	51%	51%

Acceptable borderline:

	Range	Average	Median
EAS 11/15	5 - 90%	31%	24%
Other 5/7	2 - 25%	18%	21%
Total 16/22	2 - 90%	27%	22%

8. *TEN RESPONDENTS FOUND ONE OR MORE SUBCATEGORIES TO BE BROADER THAN THEY HAD EXPECTED, NAMELY:*

EAS	48B	Natural Resource Management
"	48F	Geology and Geophysics
"	55C	Meteorological Data Collection, Analysis and Weather Forecasting
"	55D	Meteorological Instruments and Instrument Platforms
"	57Q	Pharmacology and Pharmacological Medicine
"	57Y	Toxicology
"	68A	Air Pollution and Control
"	68B	Noise Pollution and Control
"	68D	Water Pollution and Control
"	91A	Environmental Management and Planning
"	91H	Urban-Regional Relationships
"	99A	Analytical Chemistry
Other	45G	Communications and Information Theory
"	82A	Holography
"	88E	Reference Materials

9. *EIGHT RESPONDENTS FELT THAT _____% OF THE DOCUMENTS THEY HAD RECEIVED MIGHT BETTER HAVE BEEN CATEGORIZED UNDER SOME OTHER HEADING:*

	Range	Average	Median
EAS 6/15	4 - 92%	30%	27%
Other 2/7	50 - 90%	70%	50%
Total 8/22	4 - 92%	40%	39%

10. FOURTEEN RESPONDENTS (9/15 EAS; 5/7 Other) FELT THAT THEY MIGHT BE MISSING SOME INTERESTING DOCUMENTS, FOR THE REASONS GIVEN:

Because of lack of precision in the classification system:

EAS	4/15
Other	3/7
Total	7/22

Because subcategories were not broad enough:

EAS	2/15
Other	1/7
Total	3/22

Because scope of categories was poorly defined:

EAS	6/15
Other	4/7
Total	10/22

11. - 12. ALL RESPONDENTS, EXCEPT ONE WHO HAD NOT CHECKED OUT A READER, EXPRESSED THEMSELVES AS SATISFIED WITH THE DISTRIBUTION SYSTEM.

13. SUGGESTED OPTIMUM FREQUENCY OF DISTRIBUTION:

	Semimonthly	Monthly	Quarterly
EAS	5/15	7/15	2/15
Other	3/7	3/7	0/7
Totals	8/17	10/22	2/22
Percentage of those responding	40%	50%	10%

14. TWELVE RESPONDENTS INDICATED THAY THEY WOULD BE SATISFIED WITH A SIMPLE LISTING OF NTIS DOCUMENTS OF INTEREST TO THEM, PROVIDED THEY COULD OBTAIN COPIES FROM THE LRC:

EAS	10/15
Other	6/7
Total	16/22

FIVE OF THE TWELVE WOULD ACTUALLY PREFER SUCH A LISTING.

EAS	2/15
Other	3/7
Total	5/22

THREE INDIVIDUALS (ALL EAS) SAID THEY PREFERRED THE PRESENT SYSTEM.

ONE INDIVIDUAL SAID HE WOULD BE SATISFIED WITH A LISTING, BUT WOULD PREFER AUTOMATIC DISTRIBUTION BASED ON INDEX TERMS (i.e., "SRIM Profile.")

15. *THIRTEEN RESPONDENTS (8/15 EAS; 5/7 Other) SAID THEY WOULD BE SATISFIED TO SCAN GOVERNMENT REPORTS ANNOUNCEMENTS (IN LIEU OF SRIM OR SRIM-PROFILE,) BUT NINE OF THESE (70%) ONLY IF THERE WERE A GOOD CHANCE THAT A DOCUMENT OF INTEREST WOULD BE IMMEDIATELY AVAILABLE IN THE LRC.*

16. *SHOULD THE SERVICE BE CONTINUED?*

	Yes	No
EAS	12/15	1/15
Other	5/7*	2/7
Total	17/22	3/22
Percentage of those responding	85%	15%

** includes one "probably," one qualified (see comments).*

17. *COMMENTS*

EAS

"I feel that the operation is vital to maintaining the faculty's ability to stay up-to-date in one's field. This has immediate benefits of helping in one's teaching and research. I would strongly support the continuation of this project by the University or another agency."

"It's a worthwhile service. I only wish I had immediate access to a reader when I receive the microfiche." (Note: This individual was off campus during the entire period, and did not check out a personal reader."

(Favoring continuation...) "...if improved upon and broadened to include other faculty.")

(Favoring continuation...) "...to the degree that GSU allows, and actively wants to support, vigorous, front-line research. 'Maintenance' literature research, research-as-part of-teaching, and dabbling are excluded here."

"A very good system. Most of the problems seem to be at the NTIS end."

"With the pressures existing in GSU for faculty time and energy, this system offers a practical way to keep updated in professional information. If GSU does not actively promote and support continued scholarship, we as faculty will rapidly lose effectiveness."

(Favoring...) "...but I could do without."

"I would like to review additional categories."

"It seems improbable that the materials available are in my area of interest." (Note: This individual is primarily concerned with technical career development.)

OTHER

"Service has been excellent."

(Not favoring continuation...) "It is not worth the expense, especially in this economic crisis, because:
1) categories are poorly defined.
2) very little benefit, if not none, to the receivers."

"There have been 5 out of 25 I have used. The others were technical in an area irrelevant to me. (I would prefer listing) in more categories and/or more specific subcategories that are relevant."

"Without this system, I am sure I would never have been aware of the documents."

"With the funding crunch, these are the types of information services which round out the professional staff's knowledge resources, but which usually have to be given up in favor of more 'primary' services."

(Note: The foregoing were ordered alphabetically, which has the effect of ranking by number of subcategories per profile.)

C. SUMMARY

Formal analysis of responses in the light of the known predilections of the individuals concerned has not been undertaken, even though the record of interviews and machine searches would support it. A few observations are in order, however:

The users whose responses tended most to skew the data were individuals who had least to gain from the service, for two reasons--the file was likely to prove disappointing to them, and their previous experience and work habits were foreign to the kind of dissemination provided. This is not to say that they should have been excluded; in fact their inclusion was a good test of the effectiveness of SRIM in serving a kind of fringe clientele.

The most enthusiastic supporter of the system was a scientist whose interests are comprehensive in a fairly narrow field, but whose work

habits are such that he is accustomed to scan a great many titles to be sure of missing none through scatter.

The least enthusiastic was a humanist in the "Other" group.

Most clients in the "Other" group didn't seem to know quite what to do with the fiches when received, whereas those in the EAS group were prepared to engross them in one way or another, and were particularly active in passing them back and forth between colleagues. The EAS group also had a much better understanding of the worth of owned but (pro tem) unread documents, i.e., seeing physical possession as a giant step toward intellectual access at a time and place of one's own choosing.

In view of the large number of respondents who favored continuation of the service, it is surprising to note the number who said they would prefer or at least be satisfied with a simple listing of NTIS documents of interest to them (rather than being given the actual documents) if they were assured of their being immediately available in the library. This apparent discrepancy may be due in part to the omission of any indication of the technical problems and probable cost of the alternative 14.a, an interpretation which the poor showing on alternative 14.d--which did mention cost but not the real advantages--seems to support.

The responses to question number 15 as to the alternative of scanning GRA are not at all conclusive, nor were they intended to be, since we know that very few of the respondents are familiar with that publication. They do point up a general preference for scansion, however, which the preceding question also brought to the fore.

We did not try to ascertain the ways in which retained microfiches were ultimately used, if at all. Here again, we might have found a preference for scansion in that medium, with a strong requirement for blowback to paper copy for documents which the client needs to use in "working mode." Some indication of what might be expected from such a probe is afforded by the results of a study carried out by Giuliana Lavendel in 1972, particularly the following observation:

> "Users cannot conceive of microfiche itself as their working copy, but are willing and even eager to accept it for: 1) storage of materials, the more the better; 2) scanning and screening of files for the selection of raw material, which will be converted to hard copy."
>
> ------- Lavendel, Giuliana A., "A Minisurvey with Larger Implications: User Resistance to Microfiche at NASA's AMES Research Center," Masters thesis, California State University, San Jose, California, August, 1972. (p.31)

A sample copy of the instrument used in the survey is provided in Attachment 1 (rubrics added.)

APPENDIX V

ATTACHMENT 1

Selective Dissemination of Microfiche Project

SURVEY

Name _____

The purpose of this survey is to ascertain the usefulness of the "Selective Dissemination of Microfiche" service and to gather information on how it might be improved (a) at point of origin (NTIS) and (b) locally.

Since the first of the year, nine shipments of NTIS documents on microfiche have been received, copied, and distributed. You should have received the following quantities, in the subcategories indicated:

Out of the first five distributions, you retained _____% of those classified within the above topical set.

In deciding whether to retain a microfiche document, to what extent have you relied on the eye-legible heading?

a _____ entirely

b _____ entirely except for non-informative titles (e.g. those that are badly truncated)

c _____ partially, about _____%

What use is made of those that are retained?

_____% checked in a reader (within six weeks a ___) (within one week b ___)

c _____% filed without reading

After checking on a reader, what portion do you usually retain?

_____%

How do you dispose of those that are not retained (either before or after checking in a reader)?

a _____% *returned to LRC*

b _____% *passed to a colleague or student*

c _____% *discarded*

What percentage of the documents distributed to you have you found to be relevant to your interest?

_____%

How many irrelevant titles are you willing to glance at on the chance of identifying one title of immediate or potential interest to you?

_____

In a system such as we have been operating, what do you consider to be an acceptable relevance/irrelevance ratio?

a _____% *relevant*

b _____% *dubious*

c _____% *irrelevant*

Which of the designated subcategories (above) have you found to be broader than your expectations?

Have you encountered documents which you feel might better have been categorized under some other heading?

a _____ *yes, about* _____% (*b*)

c _____ *no*

Do you feel you may be missing some interesting documents?

a _____ *Yes, because of lack of precision in the classification system*

b _____ *Yes, because subcategories are not broad enough*

c _____ *Yes, because the scope of the subcategories is poorly defined*

d _____ *No*

Has the local distribution system been satisfactory?

a _____ *Yes*

b _____ *No*

If "No", how should it be improved?

What is optimum frequency for distributions, as far as your own work habits are concerned?

a _____ *Twice a month (current frequency)*

b _____ *Once a month*

c _____ *Quarterly*

Would you be equally satisfied with a simple listing of NTIS documents of possible interest to you, knowing that you could obtain copies of any of them from the LRC?

a _____ *Prefer listing*

b _____ *Satisfied with listing*

c _____ *Prefer automatic distribution, as at present*

d _____ *Prefer automatic distribution, but based on index terms rather than categories*(1)

(1) *This might be considerably more expensive than the present system*

Would you be equally satisfied to scan the semi-monthly Government Reports Announcements to find out about documents of possible interest?

a _____ *Yes*

b _____ *Yes, but only if there were a good chance that a document of interest to me would be immediately available in the LRC.*

c _____ *No*

The present system serves 24 faculty members, and in the past 4½ months has distributed 1341 copies of 891 documents, which otherwise would probably not have come to their attention. In your opinion, should the university provide necessary clerical FTE (about 1¼ days per month), commodities (6¢ per copy), and document cost (55¢ per document), to continue the service?

a _____ *Yes*

b _____ *No*

Comment: